

In the Claims

The claims are as follows:

Claims 1-9 (canceled)

10. (withdrawn) A method of forming a magnetic device, comprising the steps of:

providing an insulating layer on a first electrode layer and a second electrode layer on the insulating layer, wherein the first electrode layer includes a first magnetic material, wherein the second electrode layer includes a second magnetic material, and wherein the second electrode layer has an initial thickness;

etching away a portion of the second electrode layer, leaving a remaining first portion of the second electrode layer and a remaining second portion of the second electrode layer, wherein the remaining first portion has a first thickness that is equal to the initial thickness, and wherein the remaining second portion has a second thickness that is less than the initial thickness; and

removing the remaining second portion of the second electrode layer by physical etching.

11. (withdrawn) The method of claim 10, wherein the physical etching comprises sputter etching with particles bombarding the remaining second portion of the second electrode layer, and wherein the bombarding particles each have a kinetic energy that is between the sputtering threshold energy of the second electrode layer and the sputtering threshold energy of the insulating layer.

12. (withdrawn) The method of claim 11, wherein the kinetic energy is between 20eV and 40 eV.

13. (withdrawn) The method of claim 11, wherein the bombarding particles have a mass which is heavier than the mass of a metallic element of the second magnetic material of the second

electrode layer.

14. (withdrawn) The method of claim 11, wherein the bombarding particles are selected from the group consisting of Kr ions and Xe ions.

15. (withdrawn) The method of claim 10, wherein the insulating layer comprises a non-magnetic material element, and wherein the mass of the non-magnetic element is lighter than the mass of a metallic element of the second magnetic material of the second electrode layer.

16. (withdrawn) The method of claim 10, wherein etching away the portion of the second electrode layer comprises chemically etching away the portion of the second electrode layer.

17. (withdrawn) The method of claim 10, wherein etching away the portion of the second electrode layer comprises physically etching away the portion of the second electrode layer.

18. (withdrawn) The method of claim 10, wherein the second thickness does not exceed 5 nm.

19. (withdrawn) The method of claim 10, wherein the first magnetic material comprises a soft-magnetic material.

20. (withdrawn) The method of claim 10, wherein the second magnetic material comprises a hard-magnetic material.

21. (withdrawn) The method of claim 10, wherein the second electrode layer in the providing step comprises a basic layer on the insulating layer and a layer structure on the basic layer,

wherein the layer structure comprises at least one layer, wherein the layer structure effectuates a magnetic pinning of the basic layer, wherein etching away a portion of the second electrode layer comprises:

etching away a portion of the layer structure selectively with respect to the basic layer;

and

etching away a portion of the basic layer such that a remaining portion of the basic layer is comprised by the second portion of the second electrode layer.

22. (withdrawn) The method of claim 21, wherein the basic layer comprises a ferromagnetic layer.

23. (withdrawn) The method of claim 21, wherein the layer structure comprises an anti-ferromagnetic layer.

24. (withdrawn) The method of claim 21, wherein the layer structure comprises a hard-magnetic ferromagnetic layer.

25. (withdrawn) The method of claim 21, wherein the layer structure comprises an artificial anti-ferromagnetic structure comprising two anti-parallel magnetic layers separated by a metallic intermediate layer.

26. (withdrawn) The method of claim 10, further comprising after removing the remaining second portion of the second electrode layer: forming a protective layer on the insulating layer.

27. (withdrawn) The method of claim 26, wherein the protective layer includes an insulating

material.

28. (withdrawn) The method of claim 10,

wherein prior to etching away the portion of the second electrode layer, forming a shielding layer on the first portion of the second electrode layer to protect the first portion of the second electrode layer from being etched away during said etching away; and

wherein after removing the remaining second portion of the second electrode layer, removing the shielding layer.

29. (withdrawn) The method of claim 28, wherein the shielding layer comprises photoresist.

30. (withdrawn) The method of claim 10, further comprising providing a magnetic yoke in magnetic contact with the first electrode layer.

31. (withdrawn) The method of claim 30, wherein the magnetic yoke comprises an interruption that includes an insulating material.

32. (withdrawn) The method of claim 30, wherein the magnetic yoke comprises a non-magnetic transducing gap that includes an insulating material.

33. (previously presented) A magnetic device, comprising:

an first electrode layer including a first magnetic material;

an insulating layer on the first electrode layer; and

a second electrode layer including at least one magnetic material, wherein the second electrode layer comprises a basic layer on the insulating layer and a layer structure on the basic

layer, wherein the basic layer includes a central portion and a peripheral portion, wherein the central portion and the peripheral portion are each in direct mechanical contact with the insulating layer, wherein the peripheral portion circumscribes the central portion and is integral with the central portion, wherein the thickness of the peripheral portion is less than the thickness of the central portion, and wherein the layer structure effectuates a magnetic pinning of the basic layer.

34. (previously presented) The magnetic device of claim 33, wherein the insulating layer comprises a non-magnetic material element, and wherein the mass of the non-magnetic element is less than the mass of a metallic element of the second magnetic material.

35. (previously presented) The magnetic device of claim 33, wherein the first magnetic material comprises a first soft-magnetic material.

36. (previously presented) The magnetic device of claim 35, wherein the at least one magnetic material comprises:

- a second soft-magnetic material in the central portion of the basic layer;
- the second soft-magnetic material in the peripheral portion basic layer; and
- an anti-ferromagnetic material in the layer structure.

37. (previously presented) The magnetic device of claim 35, wherein the at least one magnetic material comprises:

- a second soft-magnetic material in the central portion of the basic layer;
- the second soft-magnetic material in the peripheral portion basic layer; and
- a hard-magnetic material in the layer structure.

Claim 38 (canceled)

39. (previously presented) The magnetic device of claim 35, wherein the at least one magnetic material comprises:

- a ferromagnetic material in the central portion of the basic layer; and
- the ferromagnetic material in the peripheral portion basic layer.

Claims 40-41 (canceled)

42. (previously presented) The magnetic device of claim 35, wherein the basic layer comprises a ferromagnetic material, and wherein the layer structure comprises an artificial anti-ferromagnetic structure comprising two anti-parallel magnetic layers separated by a metallic intermediate layer.

43. (previously presented) The magnetic device of claim 33, further comprising a protective layer of insulative material on the insulating layer, wherein the protective layer circumscribes the basic layer, and wherein the protective layer is in direct mechanical contact with the basic layer and with the insulating layer.

44. (previously presented) The magnetic device of claim 43, wherein the thickness of the protective layer is less than the thickness of the second electrode layer.

45. (previously presented) A magnetic device, comprising:

- an first electrode layer including a first magnetic material;
- an insulating layer on the first electrode layer, wherein the insulating layer comprises a

non-magnetic material element;

a second electrode layer including at least one magnetic material, wherein the second electrode layer is on a first portion of the insulating layer and is not on a second portion of the insulating layer, and wherein the mass of the non-magnetic element is less than the mass of a metallic element of the at least one magnetic material; and

a magnetic yoke in magnetic contact with the first electrode layer.

46. (previously presented) The magnetic device of claim 45, wherein the magnetic yoke comprises an interruption that includes an insulating material, and wherein the interruption directly contacts a portion of a surface of the first electrode layer.

47. (previously presented) The magnetic device of claim 46, wherein the magnetic yoke further comprises a non-magnetic transducing gap that includes the insulating material.

48. (previously presented) The magnetic device of claim 45, further comprising a protective layer of insulative material on the insulating layer, wherein the protective layer circumscribes the second electrode layer, wherein the protective layer is in direct mechanical contact with both the insulating layer and the second electrode layer, and wherein the thickness of the protective layer is less than the thickness of the second electrode layer.

49. (previously presented) The magnetic device of claim 45, wherein the second electrode layer comprises a basic layer on the insulating layer and a layer structure on the basic layer, wherein the basic layer is in direct mechanical contact with the insulating layer, and wherein the layer structure effectuates a magnetic pinning of the basic layer.

50. (previously presented) The magnetic device of claim 49, wherein the first magnetic material comprises a first soft-magnetic material, and wherein the at least one magnetic material comprises a second soft-magnetic material in the basic layer and an anti-ferromagnetic material in the layer structure.

51. (previously presented) The magnetic device of claim 49, wherein the first magnetic material comprises a first soft-magnetic material, and wherein the at least one magnetic material comprises a second soft-magnetic material in the basic layer and a hard-magnetic material in the layer structure.

52. (previously presented) The magnetic device of claim 49, wherein the basic layer comprises a ferromagnetic material, and wherein the layer structure comprises an artificial anti-ferromagnetic structure comprising two anti-parallel magnetic layers separated by a metallic intermediate layer.